

ATOMIC ENERGY

ROBERT M. SHERMAN, EDITOR. PUBLISHED BI-WEEKLY BY ATOMIC ENERGY NEWS, INC., 508 FIFTH AVENUE, NEW YORK 17, N. Y.

August 1st, 1950.

Vol. 3...No. 12

Dear Sir:

Technical progress toward nuclear power were among the 156 papers presented to the delegates from over 50 countries who attended the Fourth World Power Conference, recently held in London. Sir John Cockcroft, director of Britain's atomic program, said that country was not likely to embark on any large-scale development of nuclear power before at least the following decade. He noted that to supply all of Britain's electrical requirements by nuclear power from natural uranium reactors would require 600-metric tons of pure uranium--a large proportion of the whole world's present known supply of high-grade ore. Dr. Ragnar Liljeblad, of Sweden, warned that even if primary atomic heat were freely available at practically no cost, the figures do not show that atomic energy would be able to bring about any economic revolution. He estimated the future price of highly refined uranium at possibly ten times the pre-war price for commercial uranium of £ 2,000/ton. Ward F. Davidson, New York (Consolidated Edison Co.), felt that there is little reason to expect that nuclear power plants can compete on a cost basis with coal, or similarly fueled plants, for several decades. He admitted that use is likely to be made of energy otherwise wasted in connection with the manufacture of bomb material. Atom powered ships and aircraft, he noted, probably will find that higher direct costs are compensated for by the lesser weight of fuel they must carry. David A. Keys, vice-president of the National Research Council, Canada, told the conference that Chalk River's 1,200 employees, and two heavy water nuclear reactors, are working directly toward the peacetime, and educational aspects of nuclear power. L. Kowarski, scientific director of France's Atomic Energy Commission, emphasized how lack of funds was holding back scientific progress in that country. Now, he said, only 0.2% of France's national income is spent on nuclear research; some 600 persons are employed. Even so, he declared, France is the only other country outside of the United States, Canada, Britain, and Soviet Union, to have succeeded in producing a nuclear chain reaction.

Security measures against ship-borne atomic weapons are now in effect in New York, and San Francisco and other West Coast ports. In New York, customs agents will search (within the limits of practicability, since freighters can only be thoroughly checked when discharging cargo) for hidden atomic bombs all ships which have touched ports in the Soviet Union or in any of its satellites, before the ships are allowed in New York harbor. Meanwhile, the Senate in Washington last week gave final Congressional approval to a bill authorizing the President to search and control movements of all foreign ships entering U. S. waters; the legislation is to assist with money and manpower the present limited work of customs agents in preventing a potential enemy from bringing an atomic bomb into U.S. ports under the guise of merchant shipping.

AT THE ATOMIC CITIES & CENTERS IN THE UNITED STATES...

OAK RIDGE, Tennessee- Low bid for construction of the new isotope research facility, and semi-works, at the National Laboratory here, has been received from the J. W. Bateson Co., Inc., Dallas, Tex. Bid was \$2,477,048.00. Research with radioisotopes having high level radiation will be carried out in the building, which will also have facilities for studies in radioactive chemical processing. The project is another step in the \$19,000,000.00 construction and improvement program at the Laboratory, which began February, 1949, and is expected to be completed by June, 1952....Contractors have now been invited by the AEC here (inv. no. 401-51-1A, closing date Aug. 8) to bid on construction of a new experimental research building at the Oak Ridge National Laboratory. The building will house one of the Laboratory's nuclear research projects.

RICHLAND, Washington- A natural gas pipeline, to supply Hanford Works, is now in the offing. Pacific Northwest Pipeline Corp. have asked the Federal Power Commission for permission to construct a \$200,000,000.00 pipeline from Houston, Texas, to the Pacific Northwest. Plans call for a 2,400 mile pipeline, to deliver 250,000,000 cubic feet of gas daily to cities of the northwest; as projected, the pipeline would extend to Vancouver, B.C. Company officials said the line would originate in the gas-rich gulf coast fields near Houston, and cross Texas for 500 miles to tap the fields of west Texas and the Panhandle.

LOS ALAMOS, New Mexico- Los Alamos and nearby Sandia Base (atomic weapons engineering center) are the only atomic energy facilities which have been designated by the Federal Bureau of Investigation for special attention, FBI officials in Washington have disclosed. The large atomic energy operations at Los Alamos, and in the immediate vicinity, were responsible for setting up the FBI office in Albuquerque, N.M., close by Sandia Base.

ATOMIC PATENT DIGEST...latest U. S. & British applications & grants...

GREAT BRITAIN- Radioactive metallic foil product. Complete specifications accepted from U. S. Radium Corp.: British Pat. No. 642,072.

UNITED STATES- Radioactive measuring device, adapted to be connected to a source of high potential. The gaseous filling of the casing of the device consists of a rare gas selected from the group consisting of argon, neon, and krypton, and contains from 0.1% to 10% of anhydrous ammonia. U. S. Pat. No. 2,512,773, issued June 27, 1950; assigned to Texaco Development Corp., N. Y.

Carrier for radioactive slugs. Body of the container is made of radiation shielding material. Inside this body is a cylindrical cavity, containing a rotatably mounted cylinder, with bores or chambers angularly spaced around the axis of rotation, and designed to contain cartridges of radioactive material. The cylinder may be locked into position by a locking bolt. U. S. Pat. No. 2,514,909, issued July 11, 1950; assigned to the United States of America (USAEC).

Quick operating valve. The valve crank can rotate past dead center in one direction to move the valve away from the operating mechanism and engage the seat; and can move past dead center in the other direction to disengage the valve. Resilient means, interposed between the valve and valve stem, are so compressible as to permit the crank to rotate past dead center position after the valve seats. U. S. Pat. No. 2,515,159, issued July 11, 1950; assigned to the United States of America (USAEC).

The following patents, issued July 18, 1950, to Well Surveys, Inc., Tulsa, Okla., are in the field of sub-surface exploration with neutron logs: (1) Method of well logging. No. 2,515,500. (2) Neutron well logging. No. 2,515,502. (3) Method and apparatus for producing neutron logs of drill holes. No. 2,515,534. (4) Method and apparatus for neutron well logging. No. 2,515,535. (5) Neutron logs. No. 2,515,745.

Adjustable centrifugal switch. An electrical switch, responsive to the speed of rotation of a shaft, which may be adjusted to vary the speed at which the contact pin breaks contact with the contact element. U. S. Pat. No. 2,516,050, issued July 18, 1950; assigned to the United States of America (USAEC).

NEW PRODUCTS, PROCESSES & INSTRUMENTS...for nuclear work...

The "Isotron", a semi-automatic device for tumor diagnosis, heart disease study, and such specialized research as studies of whole blood volume, and the peripheral vascular system. Developed in collaboration with Drs. Davis, Leroy, Cooper and Ashkenazy, Northwestern University Medical School. An example of its use is in brain tumor diagnosis. Here, radioactive diiodofluorescein is used, as it has been shown that it concentrates in tumor tissue. Using the two Geiger counter "arms" of the Isotron, readings are taken at 32 points on the head. By means of a circuit which calculates the amount of unbalance between the two main channels, these readings indicate whether or not tumor tissue exists. The instrument incorporates two separate channels with scaling circuits, count rate circuits, and automatic timing controls.--Nuclear Instrument & Chemical Corp., Chicago, Ill.

Gamma-ray bomb, for industrial radiography. Recommended for iridium-192, a soft gamma source, which has given good contrast when used for radiographs of welds and small castings. Manufacturer says bomb can be safely handled when loaded with as much as 20 curies of iridium.--E.R.D. Engineering Co., Ltd., Ipswich Road, Slough, Bucks. (England).

Substantial reductions in air freight costs, and general utility of operation, have marked the first few months of air transportation of radioisotopes, in wing tips of commercial aircraft, between England and South Africa. Originally, the National Physical Laboratory, of the South African Council for Scientific and Industrial Research (which has the sole right to import radioisotopes into South Africa) had been faced with the problem of transporting to the Union, over a distance of 6,000 miles, radioactive substances from the atomic piles at Harwell, England. Air transport was the only feasible method to handle short lived radioisotopes, but the weight of the necessary lead shielding made the high freight charges prohibitive. Wing tip air transport of radioactive materials was therefore decided upon, since calculations showed that with the D. C.-4 aircraft used on the run (wing span of more than 100-feet), the radiation levels in the cabin would not be above tolerance dosage. A limit on such loads, however, was placed at 100 millicuries, as this was satisfactory for sodium-24, a high energy gamma emitter, and would be more so for the lower energy gamma emitters. As designed by engineers of South African Airways, a cylindrical receptacle is built into the wing-tip of one wing of each D. C.-4. The metal cylinder has a large flange at its open end, and this flange is riveted over an opening in the upper wing surface, so that when the flush snap-down lid of the receptacle is closed, the lid and the flange form part of the upper surface of the wing, while the cylinder hangs down inside the wing. The receptacle is lined with sponge rubber, leaving a space just large enough to take a brass container with screw top and lifting eye, which in turn contains the aluminum can used by Harwell for transporting radioelements. (Conventional lead cases are used for transport to and from airports). An example of the economy achieved are some wing-tip shipments of sodium-24 recently made. For transporting more than 12 microcuries, the air freight cost (exclusive of agents fees, and other extras amounting to £4 10s.) from London Airport to Palmietfontein, in Johannesburg, was eighteen shillings. This compares with as much as £70 for air freight for this run on one or two millicuries of sodium-24 in a conventional lead container.

Observations and recommendations on the use of radioactive static eliminators on printing presses have been made by I. L. Berman, M.D., Medical Director, and E. P. Ernest, Safety Officer, of the U. S. Government Printing Office. Two "Ionotrons" (U. S. Radium Corp.) have been used on two presses at the Government Printing Office. (The "Ionotron's" alpha radiation ionizes the air between the paper and the eliminator, thus permitting the static charges to flow through the ionized air, and thence to ground.) Tests showed that during normal operation, operators were exposed to less than 100 mr per week, while helpers were exposed to as much as 200 mr per week. Berman and Ernest recommend, when such eliminators are used, that: (1) The potential hazard be understood by responsible officials, (2) Proper installation be made, (3) An adequate survey and follow-up conducted, to include clinical study, laboratory study, and instrument study.

RAW MATERIALS...radioactive ores & other essentials for nuclear work...

UNITED STATES- Airborne Geiger counters have located radioactive anomalies in the Northern Peninsula of Michigan, Secretary of the Interior Oscar L. Chapman disclosed last week in Washington. Discovery of these anomalies, or areas showing higher-than-normal radioactivity, were the result of a series of flights made over northern Michigan, during this past May and June, by a specially equipped aircraft of the Geological Survey, Department of the Interior. All traverses were flown north and south, and approximately 500-feet above the ground, at quarter-mile intervals; the aircraft's flight path was recorded by a gyro-stabilized, continuous-strip-film camera. Nineteen Geiger counters, connected in parallel, were used in the aircraft. The hard component of cosmic radiation was reduced both by a special circuit, and by arranging the counter tubes in hexagonal bundles. In this way, the background noise due to cosmic radiation was greatly diminished, and gamma radiation from ground sources could be measured more accurately. A map, showing the results of this 1,600 square mile survey, with explanatory text, may be obtained without charge from the Director, U. S. Geological Survey, Washington 25, D. C.

Grand Junction, Colorado- An industrial site has been acquired here by the Vitro Manufacturing Co., Pittsburgh, and this firm has opened an office in the vicinity. Vitro plans to enter the Colorado Plateau area as a refiner of uranium-bearing ores and raw materials. (See AEN 7/4/50: "Vitro Manufacturing Co. acquires stock and assets of Kellogg Corp., engineering firm in field of nuclear engineering".)

CANADA- Eldorado Mining and Refining (1944) Ltd., the Canadian government-owned uranium and radium organization, has now reported a net profit of \$2,199,590.00 for the year 1949. This compares with \$1,335,599.00 in 1948. (Increasingly large sales of uranium are being made to the U. S. Government, which is attempting to lessen its dependence upon Belgian Congo sources.) Mining operations at Port Radium, Northwest Territories, during 1949, incurred a total operating cost of \$1,414,666.00, or 8% less than 1948, and 14% less than 1947. For 1949, the development footage was approximately 10,600-feet, or slightly less than 1948. Estimated ore reserves at the end of 1949 showed an improvement over estimated reserves at the same time a year earlier. The uranium circuit of the refinery at Port Hope operated at a normal rate in 1949, with operating costs of \$1,083,826.00, or 7% less than in 1948. The reduction, achieved despite increased labor and material costs, was due to improved refining techniques, with higher recoveries and lower reagent consumption per unit produced. At the radium filling laboratories, a total of 1,443 individual medical and industrial units were filled and shipped. A new and cheap source of polonium was developed, and the company can now produce polonium in unlimited quantities. Of five prospecting parties placed in the field during the 1949 season, three were in the Northwest Territories, and two in the Sault Ste. Marie area. Forty claims were staked (as a result of this activity), and at the end of 1949, the company held 259 claims, of which 226 were in Saskatchewan, and 23 in the Northwest Territories.

BRAZIL- The possibility that exports of monazite sands in the natural state will be banned has prompted Fomil, rare earth firm here and a subsidiary of Lindsay Light and Chemical Co., West Chicago, to advise the Brazilian Government that it will industrialize rare earths in Brazil, should such an export ban be promulgated. Fomil has acquired the Brazilian monazite deposits of Atlantica, an organization set up by E. I. du Pont de Nemours, which, during World War II, and until 1947, prospected the more important beds on the coast of Rio de Janeiro, Espirito Santo, and Bahia. The reserves here are estimated at 3.5 million tons, comprising 2 million tons of ilmenite, 600,000 tons of zirconite, and 150,000 tons of monazite. Two other companies, founded in 1949, are also in the field here. Orquima, in San Paulo, and Oximetel, in Niteroi, State of Rio Janeiro, are now treating monazite sands chemically, producing chlorite and sulphate of cerium, which is being exported to the European continent. Monazite has hitherto been shipped in the natural state, and since 1942, in accordance with the Washington Agreements, has been shipped exclusively to the United States.

IONIZING RADIATION...investigations & notes...

An investigation of the absorption and distribution of vitamin A in x-irradiated rats has been made by L. R. Bennett, V. C. Bennett, A. Shaver, and T. Grachus, of the Department of Radiation Biology, University of Rochester School of Medicine and Dentistry, Rochester, N.Y. In the work, the absorption of vitamin A alcohol by young female rats at varying intervals during the first week following 625 r of whole body irradiation, was studied 6 and 10-hours after a test dose of vitamin A. It was found that absorption after a 6-hour test is increased from the 2nd to 6th days in irradiated animals. After a 10-hour test, there was little difference between irradiated and control animals. It was observed that the liver content of vitamin A is decreased, in irradiated animals, and there is an increase in carcass vitamin A. It was also found that adrenal vitamin A is less in irradiated than control rats, at 6-hours, and is increased above control rats at 10-hours.

A study of the effects of adrenalectomy on radiation induced mortality in the mouse has been made by E. P. Cronkite, and W. H. Chapman, of the Naval Medical Research Institute, Bethesda, Md. The adrenalectomized mice were irradiated at the rate of 15 r per minute with the angular beam of a 2.0 Mev industrial-type x-ray tube. Both the control and the adrenalectomized mice were subjected simultaneously to the various doses of x-radiation that were administered. The results indicated that the adrenalectomized, or "adrenal insufficient" mouse, is more sensitive to ionizing radiation than the normal mouse. It was also found that the survival time of adrenalectomized mice is shortened. As to the cause of deaths in the adrenalectomized mice, it was believed due to mechanisms other than infection and hemorrhage.

RADIOISOTOPES...as used for tracer & therapy applications...

The Sixth International Congress of Radiology, which entered its closing sessions in London last week, heard Dr. D. W. Smithers describe techniques which he and Dr. J. H. Muller used at the Royal Cancer Hospital, London. They reported the use of radioactive colloidal gold, in patients with tumors present in the abdominal walls. By rotating the patient, the injected radioactive gold was made to wash the peritoneal cavity, and it was found to have infiltrated the tumor tissues. Dr. Smithers told how he had used radioactive gold in the case of a woman suffering from cancer of the ovaries that had spread throughout the abdominal wall; now, he said, six months after treatment, she is back at work without discomfort. Dr. Muller used radioactive zinc, he said, in a similar case of spreading ovarian cancer; he reported that definite palliation was obtained. Radioactive zinc and gold, which he injected intravenously, had gone to the lungs, he stated, and had demonstrated some ability to irradiate tumor tissue there. Dr. Muller also described how he had introduced elastic bags into cancerous organs, through either natural or surgically made openings, filled them with suspended radioactive material, such as cobalt, irradiated the organs for various periods, and then had drained the radioactive fluids out of them. He declared that good results were obtained in a number of cases of advanced cancer of the bladder, the uterine body, and other organs.

Using radioautographic techniques, a study has been made of the varying uptake of radioactive phosphorous (P-32), by brain and brain tumor, as it is related to histologic pattern. In the work, by D. Steinberg, and B. Selverstone, of the Biophysical Laboratory, and Department of Surgery, Harvard Medical School, and the Neurological Service, Massachusetts General Hospital, radioautographs of human brain tumors, and of normal brain, employing P-32, were made in 18 cases. The experimenters observed that blackening (of the plate) was consistently higher in tumor tissue, than in brain, but that there was a considerable variation within certain tumors. They believe that these variations reflect differences in uptake of radioactive phosphate ions by various portions of the tumor.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER

August 1st, 1950.